Interactions Between Impacting Particles and Target in Two-Phase Flow

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The time-dependent interaction phenomena between a target and the incident solid particles borne by supersonic gas jet stream have been numerically analyzed. In particular, the analysis dealt with particles such as aluminum and copper impinging on aluminum or copper targets at various impact velocities ranging from 200 m/s to 1,000 m/s. Typical particle sizes were 50 to 100 micrometers. Typical results show considerable deformations of both the incident particles and the target when the velocity is greater than 500 m/s, fragmentation of both materials occurring in a matter of several microseconds. Experiments performed on copper particles on aluminum target demonstrate that under certain conditions (such as a supersonic gas jet issuing from a nozzle carrying solid particles) the impacts not only deform but also cause deposition of the particles onto the surface. The present analysis shows the plausibility of such a behavior when the particles impact the target at high velocities.

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